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THE INDUSTRIAL AND PRODUCTION
ENGINEERING SERVICE OF MILLER,
FRANKLIN, BASSET & COMPANY.
A DESCRIPTION OF THE WORK
THEY DO, THEIR ORGANIZATION
AND THEIR POLICIES, TOGETHER
WITH MANY LETTERS FROM THEIR
CLIENTS TELLING OF THE RESULTS
THEY GET.

MILLER, FRANKLIN, BASSET & CO.
347 MADISON AVENUE
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FOREWORD

INDUSTRIAL ENGINEERING still suffers from the mistakes—some serious, some merely ridiculous—which its pioneers made while developing the science of management.

Since it is a comparatively new profession there are as yet no standards of excellence—as there are for lawyers and doctors—up to which an industrial engineer must measure before the authorities permit him to practice. There is nothing to protect a manufacturer from the inexperienced “efficiency expert” who happens to be a glib and convincing salesman.

So mistakes are still being made by engineers whose work has taken them into only a plant or two, and who often have only a superficial knowledge of some of the more spectacular but less substantial work of the profession.

The mistakes of the old timers and the failures of the present day cub engineers, are widely advertised. The successes—and there are many of them—are less widely told of. That is why so many manufacturers doubt that industrial engineers can help any but the worst managed factories, although there are several thousand able business men who have employed industrial engineers with success.

Some are frankly afraid that an outside engineer would tie the business up in red tape and antagonize the whole organization. And this skepticism and fear will be justified unless care is taken to employ engineers who can prove that they have practised their profession for many years and have successfully served many clients.

This booklet is intended to show you just what work we, as industrial engineers, undertake to do for a client. We do not claim to work with magic. We are simply skilled in the science of management. But to tell you what we do, how we work, and how we train and supervise our men, is not enough. Nearly any one could say all that we can on these subjects.

The wise business man wants proof that we have had wide experience and that our clients are pleased with the results we get for them. The proof, therefore, is presented in the form of letters written by our clients, mostly to people who later employed us themselves. No names are given because we consider our relations with clients to be confidential. The writers of most of these letters, however, permit us to use their names. Such we will be glad to tell you, so that you can get a confidential opinion of us from them.

THIS is merely a list of the general industries in which we have worked. It is not in detail. For instance under "knitting" we might list underwear, sweaters, and knit cloth. Such a list would be too long.

| | |
|--------------------------|--------------------------|
| Machine Shops | Knitting |
| Iron and Steel Foundries | Spinning |
| Brass Foundries | Textiles |
| Rolling Mills | Garment Making |
| Forge Shops | Woodworking |
| Metal Stamping | Cabinet Making |
| Plating | Pottery |
| Enameling | Paper Making |
| Metal Spinning | Chemicals |
| Glass | Pharmaceuticals |
| Silverware | Leather Work |
| Bleaching and Dyeing | Paint and Varnish |
| Rubber | Electrical Goods |
| Candy | Canning |
| Flour and Cereal Mills | Printing & Lithographing |

*"Interdependence absolute, foreseen, ordained, decreed,
"To work, ye'll note, at any tilt an' every rate of speed."*

THESE lines of Kipling's express exactly what industrial engineering aims to secure in a business.

But a smooth-running, trustworthy mechanism is not in itself the end that we, as industrial engineers, try to achieve for a client. Unless the client gets increased profits, lower costs and greater output, he will not prize an ingenious system. A system is merely a tool with which to make money—it is not, in itself, the goal.

Industrial engineering concerns itself principally with the functions which are basic to all manufacturing; such as relations with workmen, costs, the planning and control of production, means of executive control, and like matters.

To increase profits for a client, however, we must not only be specialists in one or more of these branches of industrial engineering. As engineers we know all of the best methods and are able to select and install the one best suited to the client's need. In selecting the right method we consider all of the problems of the business as a whole—design of product, manufacturing, selling, finance, labor, management. It is surprising sometimes to find how closely two or more of these functions are intertwined. Seldom indeed can one be considered without reference to its effect on all of the others.

More than once we have straightened out financial tangles by getting after snarled-up production. From among these instances we recall in particular

one concern—considered quite modern in its methods—which was short of working capital. Our examination showed that approximately \$4,000,000 was lying on the shop floors in the shape of partly finished goods because the progress of material through the plant was slow and unplanned. We showed them how to plan production, we speeded up the movement of materials and we increased the output of individual machines and men to such advantage that in eight months the "goods in progress" inventory was reduced to about \$1,000,000. Thus the \$3,000,000 in cash which the company needed so badly was found in its own shop! And it goes without saying that the shipments increased considerably during this period.

Then too, our work in a plant, especially when we are developing cost figures, often leads us into the selling end and results in suggested changes in selling policies, methods and markets.

These points are brought up simply to show that the successful industrial engineer must be much more than an engineer and that he must know a lot about business outside of the shop itself. The broad view of business, which tests every method used and every change suggested with the question "Will it increase the profits of the business as a whole?" is what we demand in our staff-members.

It is thus apparent that we cannot advocate any set system, whether of

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WHAT OUR CLIENTS SAY

A big spring manufacturer tells what we did for him in tons and dollars:

"In May, 1915, we decided to do what had never before been done in the spring business, have a staff of efficiency engineers put in a definite cost system and, a definite efficient arrangement for the reduction of labor costs and the improvement of our business in every way. It took fifteen months to bring about anything like the condition we hoped to have.

"In May, 1916, we produced 2500 tons of springs, employing approximately 1600 men with a profit of about \$20,000. In May, 1917, one year later, and after the system had been working ten months, we produced 2500 tons of springs with 875 men at a profit of approximately \$100,000.

"We recently put them to work in our Rim and Tube Division, formerly the Welding Co. They have been working there about eight months and with wonderful results. To illustrate: in February, 1917, we shipped \$575,000 worth of goods from the Rim and Tube plant with a labor cost of \$95,000. In August we shipped \$910,000 with a labor cost of \$96,000. In September we shipped \$826,000 with a labor cost of \$88,000 and the improvement still goes on."

Worsted and woolen yarns:

"The work they did here was more than satisfactory and it is a pleasure for us to say so. It paid for itself many times over in the satisfaction it brings to us in knowing that we have our business, in every detail, thoroughly in hand."

Two letters from a company that makes elevating and conveying machinery:

"As for the satisfaction given by Miller, Franklin, Basset & Co. in making this installation — we can not say enough. We are more than pleased with their method of doing business with us, and the representatives they sent we regarded as extremely efficient in their method of accomplishing results."

"Responding to your favor of the 7th instant, would state that the fact that we have just engaged Miller, Franklin, Basset & Co. to install a routing system through our shops, at the same time to renovate and adjust to present conditions the cost system which they put in for us four or five years ago, speaks for itself. We do not know as we can say more than that, after having had experience with this company, we are now about to embark them on a much larger scheme of production engineering for our factory, than we had before."

Farm implements and heavy machinery:

"Replying to your favor of the 6th, we feel that we can highly recommend the services of Miller, Franklin, Basset & Company. They were with us here about 11 months in the year 1911. Some time back, it is true, but we have been using the systems they installed ever since, with, of course, improvements from time to time. That is one thing we admire about their methods, that they admit of continual improvement. They revised piece prices for us, they installed a complete cost system and production system, all of which have proved satisfactory."

OUR EXPERIENCE AND POLICY

costs, wage payment or what not. We seldom see two concerns so alike, even in the same industry, that identically the same methods—say of gathering cost figures—will fit both. In fact, we so thoroughly believe in the often heard remark: "My business is different" that in one city we installed four substantially different cost systems in four plants turning out identical products. This, because the personnel of the management and the form of organization of the four concerns were different. The plan which worked well in one would have caused friction had it been installed in any one of the others.

What we do bring to a client, instead of a set, patented system or theory, is an exhaustive knowledge of the methods which are working successfully in more than fifteen hundred factories, some in the same industry, some in others.

The fact that a method is used in one industry is no valid reason that a variation of it cannot sometimes be successfully used in another. Because we deal with fundamental functions of business we are able to adapt methods from one industry to another.

But we realize that to have knowledge of the specific problems of a special business is an aid to the industrial engineer. While principles of management are undoubtedly basic in all industries, anyone who knows business at all knows that every concern differs from all others just as any man differs from every other man. A basic principle is that every man must eat—but all men cannot safely eat the same food. It is so with business. Any concern can get its greatest output only when pro-

duction is planned, but the same method of planning will not do for all.

So, other things being equal, we claim that to get the best results the industrial engineer must be familiar with the processes and the peculiar conditions of an industry. If he doesn't know them when he starts, he will have to learn them in the client's plant.

This is one reason for our success: we have had a wider range of experience, we honestly believe, than any other organization of industrial and production engineers.

There may be an industry outside of our experience, but it has been many years since we have encountered a staple industry in which we could not point to several concerns for which we have worked.

On page 4 are listed under general titles, the industries with which we are familiar—those in which we have done work. To list every article we have helped to make would be impossible. For example, "pottery" might be subdivided into sanitary ware, insulators, spark-plugs and other kiln-fired clay products, for we have worked in factories making many different clay articles. Or take "woodworking." We have had as clients manufacturers of cabinet-work, airplanes, wagons and carriages, game-boards, spools, motor-boats, interior trim and street-cars,—and so on throughout the entire list of major and minor industries.

Scattered through this book are quotations from letters written by clients we have served. Almost all of these letters were written to prospective clients who had inquired about us from con-

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WHAT OUR CLIENTS SAY

A successful manufacturer of spikes and other track material:

"In reply to your letter beg to say that a representative of Miller, Franklin, Basset & Co. about eight years ago, made a preliminary report for us on conditions in our business as he saw them, and recommendations for a revised cost system, greater efficiency, and more economical methods. After considering the report, we arranged for his services, to put some of his suggestions into effect.

"In a very short time he had a comprehensive and intelligent grasp of our business and methods, which he acquired without antagonizing those he came in contact with. Some of our practice he thought it inadvisable to change, because the possible benefits would not justify doing so. In others, radical changes were made to bring out information which we had not previously been getting.

"The work of installation was performed conscientiously, rapidly, intelligently, and along common sense lines, and concluded in the latter part of 1909, and the system installed at that time has been in constant use since, we having made only minor changes to meet changing conditions.

"Their work has proved entirely satisfactory; their charges were within reason for the work performed, and in our experience they were reasonably conservative in their statements regarding the results they could accomplish. We consider the money paid them a good investment."

This man has since employed us to do work in another of his plants.

Lace curtains are not out of our sphere, as these two letters evidence:

"I can heartily recommend them to any one requiring to know the true facts concerning his own business, viewed from the standpoint of the unprejudiced observer."

"They made an exhaustive study of all of our problems and the results which they have obtained are not only surprising in many particulars, but enable us to keep a close track from month to month of the profit or loss incurred the previous thirty days.

"I can most heartily recommend these people to anyone requiring highly specialized information as to the operation of any business."

Buttons:

"They have done work for us at various times and to our full satisfaction. We believe that the organization is able to give intelligent and sound advice. Above all, we feel that they are thoroughly reliable. We emphasize this point because there are probably a good many so-called efficiency engineers who are not reliable and who may be guilty of experimenting. We esteem Miller, Franklin, Basset & Company highly."

Bleachers, dyers and finishers of cotton piece-goods:

"We consider the service they rendered us in this connection to have been most intelligently handled and we could not, I believe, have gotten the same result from another similar concern more quickly at less cost or more satisfaction."

THE SCOPE OF OUR WORK

cerns we have served. Some of the replies were shown to us. These are not chosen to show excellence in any special line, but to show how we are thought of by those we have served. If among them you do not find one from your industry, write us, for it is safe to say that we can refer you to clients in your particular branch of industry.

The work we do for manufacturers may be classified as of eight kinds:

- 1 Production planning
- 2 Cost accounting
- 3 Method
- 4 Time study
- 5 Wage incentive
- 6 Physical arrangement of the plant
- 7 Eliminating material wastes
- 8 Organization

You may be surprised not to find listed an "industrial relations" service.

We have already indicated that no cut-and-dried methods exist which can be effectively applied to any phase of manufacturing. Least of all will a package of any patented salve relieve labor troubles, for here, more than any place else, the symptoms are different.

Not that we neglect the workmen. On the contrary. We have always realized and practised what many are only now discovering. That is, that to be most successful a business must rest upon a foundation of fairly-treated, contented workers who have a real interest in their day's work.

We have proved that the management can usually get co-operation from

the men by arousing the creative instinct. Certainly it has become clear that co-operation cannot be bought with higher wages alone. In many plants, however, intelligent co-operation with the management in increasing production and decreasing costs has followed when the interest of the men in the business has been properly stimulated and encouraged.

Whatever our activity for a client, we consider the workmen.

For instance, in setting piece rates or standard times, where production is increased, we make it a point that the workmen's wage also be increased.

In this way, we are able in setting piece rates, not only to avoid antagonism, but actually to arouse the workmen's interest. A case in point occurred a few years back. We showed a workman how to handle his work so that he was able to turn out ten assemblies in place of the four which had been his ordinary day's output.

The workman thought that a new rate of thirty-five cents would be right for the assemblies under the improved methods. We made the rate forty cents, so that if he made ten a day he would earn eighty cents more than under the old schedule. Within a short time he was averaging thirteen a day, and with much less effort and fatigue than before—furthermore he was constantly on the lookout for ways further to increase his production without affecting its quality.

Also in planning production we consider the workman. We show him how, by assuring him a continuous supply of materials to work on, his earnings

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WHAT OUR CLIENTS SAY

Here is a letter from an eastern envelope manufacturer:

"Feeling that possibly you might like to know how the work that you did for us six or seven years ago has benefited us, would say that we are very much pleased with it. It has enabled us to keep our costs perfectly and with very little expense. It has enabled us to put certain economic plans in operation in our factory, which have been most beneficial to us, and in actual experience it has done for us all that you claimed it would, and we are entirely satisfied with the work you did."

From a pottery manufacturer:

"Not only does this company know its business, but they take care of it in such a nice way that if you employ them you will be sorry when they are through; that is if they now have the same men in their organization that they had when they were doing our work, which was before the war."

"We thank you for writing us because we are pleased to recommend anyone of such high grade as Miller, Franklin, Basset & Company."

Another machine tool manufacturer:

"They were the concern that established for the writer a uniform cost system for the association. When we planned to put in a cost system at our place, we naturally thought of them for the good work they had done for the industry. They installed a system for us that has proved very satisfactory indeed and we have found them especially reliable in doing exactly as they promise."

From a New England manufacturer of baskets and veneer boxes:

"Several years ago Miller, Franklin, Basset & Co. installed a cost system for us and we have been very well satisfied with its operation since that time. We consider them honest and reliable and well posted on this class of work and think you would make no mistake in employing them in whatever capacity you have in mind."

Knitwear:

"With further reference to your letter of November 7th, we have employed the services of Miller, Franklin, Basset and Company for several years, having engaged their services for auditing and production work. As evidence of what we think of their work, we have recently engaged them to do some special cost work for us."

Opinion of a firm of New York engineers:

"Would say that we have used the services of Miller, Franklin, Basset & Company as consulting accountants and have found them capable and satisfactory in every way. Aside from this the personality of the chiefs as well as of the subordinates made it a pleasure indeed for us to do business with these gentlemen."

A middle-west oil and gas-well supply manufacturing company:

"We beg to advise that a few years ago we employed Miller, Franklin, Basset & Company on some efficiency work in our factory. The work was done in a satisfactory manner and with good results."

THE PLANNING OF PRODUCTION

will not be cut down because of delays due to the fault of the management.

By explaining to a workman how each move affects him, we have found that the management can usually arouse his interest.

There are only two things a man can get from his labor—the satisfaction of instincts, and money. If you take away the first, it is no wonder that he asks for more of the other.

That the interest of the worker *can* be aroused is shown by innumerable experiences we have had—one has already been cited.

One way to revive interest in the work is to give the men in some measure, a voice in the matters that concern them. Properly worked out, this undoubtedly achieves beneficial results.

To a greater or less degree, workers have been given representation in more than a hundred American factories. In all but two or three of these the plan has been successful. The failures are easily explained: they have in almost every case been due to poor judgment on the part of the management.

We outline under the heading "Organization" on page 35, the methods we have found most effective in handling workers' representation.

Thus, whether or not the ultimate idea is to achieve workers' representation, "industrial relations" work runs through all of our efforts in the client's behalf. We do not make it a thing apart: we weave it into whatever methods we install so that it becomes a part of each day's work. No matter which of the eight types of work we are doing in a plant we keep in mind that

any system involves the men in some way and is dependent for success upon their interest and approbation.

IN the following pages we describe in detail the eight different kinds of work we do. It should not be assumed that these are discussed in the order of their importance. That would be impossible, for each is of chief importance to the concern which is weak in that particular function of management.

One concern, for instance, may know its costs accurately but be suffering from slow turnover of capital due to hitches in production. For this firm we could perhaps do little to improve the cost system, but could probably save thousands of dollars by installing a system by which production could be planned. For this concern, production planning is the most important thing we do.

The following more or less detailed description will give you a comprehensive idea of our activities as industrial and production engineers.

1 Production Planning

Production planning aims to get the maximum amount of output shipped from the plant in the shortest possible time and with a minimum investment in raw material, partly finished goods and finished goods. We frequently are able to release from the business a large amount of cash working capital which has been tied up in inventories, even though the sales may increase. Sometimes when additional factory buildings seem needed to provide production capacity to meet increasing sales, a plan-

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WHAT OUR CLIENTS SAY

Machines and tools for sheet-metal work:

"Answering your inquiry of September the 4th, would say that Miller, Franklin, Basset & Company's work here and their dealings with us were 100% satisfactory. They installed a system of cost keeping and factory control that we believe the best possible arrangement for our particular needs, and a source of profit as well as satisfaction to ourselves."

Engineers—designers of cement factories:

"We were entirely satisfied with the services of Miller, Franklin, Basset & Co., whom we consulted regarding a system of accounts for our shop, laid out by our treasurer. The services in reality amounted to only two or three days of inspection and investigation and ended in their approval of the system devised by ourselves. From this you will see that the matter was a small one, but during the discussion we were much impressed with their ability, knowledge and common sense, as well as the pleasing character of the personnel.

Should we have any further business in their line, we would go directly to them with it."

What a manufacturer of transmissions, gears and differentials says:

"Indeed you have our permission to republish the article about our planning system, mentioning our name if you wish to. The results as you have outlined them are, if anything, less striking than the ones we have actually gotten from planning our production. In this connection, we might add that we felt our effective production and planning

system helped us a great deal during the troublesome steel and railroad situation, during the past months. We suffered, of course, to some extent through the switchmen's tie-up of freight traffic, and it is of course not ended but we have many reasons for believing that our condition was greatly helped through our effective production system.

"Another point which pleased us immensely was that the installation was made by your engineers without in the least antagonizing anybody in our concern. I think this is worthy of note because when such fundamental changes in production methods are made, somebody's toes are nearly certain to be stepped on, yet everything went smoothly and without friction.

"It is very important, of course, that there be the right understanding at the outset as to what the outside engineers are to do and what the management of the plant in which the installation is being made is to do. Thorough understanding and co-operation are necessary. This must receive full support from not only the general management but from the plant management and the production head in the factory in question."

Knit goods manufacturer:

"There is no question but what Miller, Franklin, Basset & Company have the best cost and production system for the knitted textile industry, and their success with us in our Association work has been little short of phenomenal.

"If you wish further information regarding them or the extremely beneficial work which they have done for us, we will be glad to tell you."

THE PLANNING OF PRODUCTION

ning system will give the needed capacity without building.

Sales are often lost because the plant cannot make quick deliveries or keep delivery promises. Planning production will almost invariably overcome both of these handicaps.

When installing a system of production planning, we usually find it necessary to take up the following points:

What to make is the starting-point. The accuracy with which this can be known points out the particular production planning methods that will give the best results. A wide experience with different methods of production planning enables us correctly to diagnose each particular case and apply the most effective method.

When to make it. It is highly important to determine when to start each item in an order or assembly so that all parts will reach the assembly room or shipping room at the same time. Correctly determined, the inventory of work in process and finished parts will be reduced.

The amount of seasonable stocks which should be carried, when the articles manufactured are affected by style changes or do not keep well, not only has a bearing on economical production but may be a vital factor in making the business profitable.

Where maximum and minimum limits have to be set we provide means of automatic increase or decrease of such limits as demand indicates.

Control of production, after starting an order or part in the factory, is necessary to secure the best results from the planning of production. Only experience and

knowledge of conditions can avoid useless red tape and rigidity on the one hand, and ineffectiveness on the other. *Shop orders and instructions* to the shop and to the workmen are essential if the executives are to retain control of production. We determine the simplest form in which to issue orders and instructions effectively. So far as reasonable they are standardized; and we also determine the best method of handling them.

Analysis of orders is necessary in order to determine the time required by each machine or department to complete its operation on particular parts. Properly done this analysis prevents congestion in the plant and at the same time assures each department and machine enough work to keep it continuously and profitably busy.

Continuous runs for machines eliminate the time otherwise lost in setting up and taking down the tooling. Planning ahead makes it possible to group the various sales orders calling for identical operations so that this wasted time is saved. Often as much as 30% to 50% of a machine's time is lost because of changes in the set-up brought about by haphazard manufacturing.

Machine rotation. Many shops have laid so much stress on continuous run of machines on a single set-up that shop and storerooms become congested and deliveries delayed. Sometimes it pays to break down the tooling and put the machines on other work.

Overpurchasing and overmaking. Means to prevent these very expensive faults are of primary importance, par-

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WHAT OUR CLIENTS SAY

A machine company in Massachusetts:

"We are glad to say, in reply to your favor of the 6th, that the work done for us by Miller, Franklin, Basset and Company is highly satisfactory.

"This system has resulted in our being able to have complete grasp of our situation. We get absolutely the cost of our products and it enables us to locate the weak spots. We also get an analyzed report each month of the results obtained in each department.

"We believe that the introduction of this system can result only in benefit, and we are glad to recommend it to you."

Perforated metal:

"Replying to your letter 7th inst., beg to say that services rendered us by Miller, Franklin, Basset & Co. in connection with the installation of our cost system are entirely satisfactory, and we look upon them as absolutely responsible people. If you are looking for expert advice and service, we believe that they can offer you every advantage that any other reliable company could give."

Underwear:

"Answering yours of the 22nd, Miller, Franklin, Basset & Company worked in our plant about a year installing a cost system and investigating our manufacturing conditions, and we found their work highly satisfactory, and the expenditure was fully justified by the results.

"They are fine people to do business with, are thoroughly competent, and we take pleasure in recommending them highly to you."

Two letters from a collar manufacturer; the first was written seven years after the installation, the second ten years after:

"Would advise relative to the matter of which you write, that Miller, Franklin, Basset, & Co. installed a cost system for us some seven years ago, and their services proved entirely satisfactory, and it is our opinion that the work has paid for itself."

"Replying to your letter to our Mr. would advise at his request that Miller, Franklin, Basset & Co. did quite some work for us ten years ago, among other things installing a complete cost system, also revising our production end. Their installation is still in actual service and has proved satisfactory from the start, the results we are obtaining fully warranting the outlay of the expense."

This company makes gloves:

"We have employed Miller, Franklin, Basset & Co. as auditors and efficiency engineers at different times and the service they have rendered us has been satisfactory. Their work is very thorough and we would not hesitate to recommend them to anyone wishing the kind of service that they can render."

A carriage company:

"We have your favor of the 30th ult., and are pleased to give our testimony to the efficiency and dispatch with which you investigated our business methods. At the time we were pleased with your recommendation and the intervening years have testified to the wisdom of your recommendation."

THE PLANNING OF PRODUCTION

ticularly in lines where changes in style or engineering advancement may make the overproduction valueless. Every shop has its "morgue" of things it wishes it hadn't made.

Spoiled work must be quickly replaced or production will be held up while new parts are made. Spoilage may be planned for and provision for it should be made. This is especially important where the assembly of numerous parts into a complete product may be delayed by a single part spoiled in process.

Providing work ahead for each man enables him to keep busy on productive work instead of losing time waiting for work or tools. Usually it is advisable to have the man's next job taken to him together with the necessary tools and instructions. This not only saves time he would otherwise spend idly or in hunting up his own work or tools, but enables him to make certain that the tools are those he should use. Often 10% or more of a man's time is wasted through lack of planning. Tools kept in condition make for good and rapid work, but as a rule the workman should not be allowed to sharpen or repair his own tools. This can better be planned for and done by the tool department.

Flexibility of production must be provided. Emergencies are bound to occur by which the plant may be completely upset if the planning is too rigid. Sometimes the question is asked "But what's the use of planning when something unforeseen may knock your plans to pieces?" The answer is that only a small part—usually less than 10%—of production is out of the ordinary, so

why not plan the remaining 90% and allow for the 10%? Unplanned, production is all on an emergency basis, as is evident from the furor and uproar which is the normal condition in plants where the work is not planned. We never install production planning methods so rigidly that emergencies cannot be satisfactorily handled.

Emergencies can usually be minimized by analyzing the causes that interfere with the execution of plans. Thus we reduce these causes to a half dozen or so and can to a degree guard against their occurrence and recurrence.

Storage of parts or assemblies is a problem which is worth solving. Sometimes it is best to keep the articles in stock completely assembled and ready to ship. Or again it may be best to keep the finished parts in stock ready to be assembled on order. Storing of sub-assemblies may give the best results. Many factors enter into the solution of this problem which must be considered for the individual plant. The arrangement of parts in the storerooms may also be standardized to save space; to facilitate the finding of materials; to simplify the work of taking inventory; and to reduce the force of clerks.

Shop load. We provide means to determine how much work there is ahead of each department or each class of machines. This is important in order to give warning well in advance whether to lay off or take on men, when and where it will be necessary to run overtime, and what kind of work we will need and when we will need it to keep all machines equally busy.

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WHAT OUR CLIENTS SAY

Four letters from a manufacturer of sheetings and bed spreads:

"We recommended the concern to two of our competitors and we understand that the cost systems installed for them by Miller, Franklin, Basset & Company have been very satisfactory. On account of the service they have rendered us and our friends, we feel that we can unqualifiedly recommend them to anyone who needs services in their line."

"I believe they are a highly reliable and up-to-date concern and I am sure any work they do will prove satisfactory."

"This is to certify that Miller, Franklin, Basset & Co. of New York installed a cost system in our mills some eight years ago, since which time we have operated under the same and have found it efficient and capable of furnishing us with the information desired. We have tested this system out in various ways during the years it has been in operation and have come to feel that it is accurate and can be depended upon to give us the exact cost of our goods. We, therefore, feel that the work they did for us was extremely valuable and we recommend them to any one who needs such service as a highly efficient and thoroughly satisfactory concern to do business with."

"In reply to your letter of the 1st inquiring as to our experience with Miller, Franklin, Basset & Co., I beg to advise that over eight years ago they installed in our plant a cost system which has been in constant operation

since that time. During this period we have had occasion to test it out in various ways to prove its efficiency and correctness and it is a pleasure to say that in every instance we have found it was giving accurate results. In my opinion this concern is well organized and thoroughly capable of fulfilling any undertaking in their line which they engage upon. If your experience proves the same as ours, you will find nothing to condemn but much to commend in the service which they render you."

Knitgoods:

"This work was done last year in our yarn mill and we were very much pleased with results. They are now working on a new system for our knitting mill and of course what the result will be it is too early to say, but we expect that it will be good. At any rate they have saved us considerable money in the yarn mill - more than enough to pay for the work they did for us. We feel sure that they will do equally as well in our knitting mill."

Importers and wholesale grocers:

"In reply to your inquiry on Miller, Franklin, Basset & Co., our Mr. ... has directed the writer to inform you that we have always found this concern to be highly satisfactory in every respect. We accordingly take pleasure in recommending them."

A well-known rubber company:

"In answer to your favor of the 15th, have to say that the services rendered by Miller, Franklin, Basset & Co. were very satisfactory to us."

GETTING ACCURATE COST FIGURES

2 Cost Accounting Methods

Cost accounting methods are necessary to the economically run business. They are valuable not only as a guide in setting selling prices, but as indicators of efficiency in the various departments. By watching month to month fluctuations in the cost of labor, material and overhead, the forceful executive is given a method of control which is a powerful means of increasing efficiency.

To the selling end of the business, too, cost figures are often of considerable value in indicating which lines may be pushed to best advantage, which markets are most profitable and so on. In several instances, cost figures which we have developed have shown that supposedly profitable goods have really been sold at a loss, and the changes of selling and manufacturing policy which resulted have turned unprofitable businesses into profitable ones.

Here are some of the advantages of a correctly designed cost system:

The basis on which costs are figured determines to a great degree the accuracy of the costs. Sometimes the figures must be so gathered as to give the cost of the article or lot. Better control of operations results if the costs are gathered by departments or operations. Sometimes, however, the clerical expense of this method is greater than the benefits warrant. The peculiarities of each industry, of each plant, in fact, will govern. Not only the accuracy of costs, but the clerical labor involved in getting them, depends to a very great degree upon the correct choice of a cost basis.

Reports for the executive, such as time reports, comparative labor cost records, and comparative material cost records, may be obtained in the process of gathering costs. These are of utmost value in controlling operations.

Accurate distribution of such items as power, heat, light, depreciation, taxes, and so forth to the various departments, is an early step in cost finding, which if incorrectly done will throw the resulting cost figures off so much as to make them valueless.

General and departmental expense must be correctly distributed over the product. This is the major cost problem in most industries and the one least often correctly solved. If incorrect, cost figures are worse than useless. At the same time, the distribution must be effected without too much effort. The value of exact, minute figures must be balanced against the cost of the clerical effort required to get them.

Monthly and periodical records of overhead expense, itemized and compared with those of other periods, quickly obtained, give a clear picture of the tendencies of a business.

Tying up costs with the general books is easily possible, although not often achieved. The value of having this check on the operations of the business will be obvious. All of our installations have this feature.

A monthly profit or loss by classes of product manufactured is always available from our installations. Such statements are of the utmost value to the executive who dictates the manufacturing and selling policies of a concern.

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WHAT OUR CLIENTS SAY

Builders of special machinery.

"Miller, Franklin, Basset & Co. have since been just as interested in the working of the cost system which Mr. Franklin introduced and have now and again suggested changes to meet varying conditions, having advised us that this was a part of their service. To any concern in need of a cost system, or desiring to improve an older system, we feel that with our experience and the service we have received we should like very much to recommend Miller, Franklin, Basset & Company.

"We now feel that we certainly could not do business without their system or something equal to it. There is no question in our minds but what the cost has been returned to us many times over."

Steel tubing and special shapes, railroad track material:

"Their work was good. They took the plant which had practically no system and left it with one which we consider very well adapted to our needs and one which is run remarkably cheaply. Their fundamental scheme of an 'expense analysis' made before the books are closed, is, I believe, the best portrayal of expenses that can be made up and it alone has been worth all that we paid them."

A glove manufacturer:

"We are pleased to advise you that the service which Miller, Franklin, Basset & Company rendered us was highly satisfactory and we have no hesitancy in recommending this firm to you for any work of this nature."

Bleachers, dyers and finishers:

"Replying to your inquiry of the 1st instant, in reference to the value of the work done for us by Miller, Franklin, Basset & Co. of New York, we beg to advise that these people, about four years ago, revised our entire cost system, and the work was well done and thoroughly satisfactory. In proof of this, we are using to day with satisfaction the system which they installed for us."

Automobile parts:

"Replying to yours regarding Miller, Franklin, Basset and Company, beg to say that they have done some efficiency work for us in our Division for the past two years and the work has been most excellent. We think enough of them to have them work for us in other divisions, which they are now doing. We have found them capable and honest."

Here is a letter from a manufacturer of light machinery:

"Replying to your letter of the 15th instant, would say that we have done business with Miller, Franklin, Basset & Company for a number of years and have found their services entirely satisfactory."

A nationally known garter manufacturer writes:

"We regard them as very competent people and the men they sent here were courteous and efficient and we have no hesitancy in saying that, given the room and facilities for developing their plans in the way they would like, they can produce satisfactory results."

ELIMINATING RED TAPE

Sales expense by territories or by salesmen, where desired and warranted, can be made a feature of a cost system, so that the efficiency of a salesman may be measured by the profits he makes rather than by his gross sales. This often suggests that certain territories be dropped, or that sales in some territories be handled in another way. Surprising results have been obtained by paying salesmen on a basis of profits rather than of sales.

The cost units in use are sometimes incorrectly chosen, which results in difficult or impossible cost reporting. Our experience enables us, after an investigation of your peculiar conditions, to select those units which will, at the least expense, give accurate costs.

The estimating department is often really a "guessing department" unless costs are reported to it in such form as to be of use in the future estimating. We not only co-ordinate the cost and estimating departments but establish a method for checking the actual costs with the estimated costs.

The payroll analysis which is a part of every effective cost system indicates the activity of departments, fluctuations of wage rates and the varying relations between productive and nonproductive labor in each department. The latter is an accurate indication of the value of foremen. These reports also give a knowledge of labor turnover.

3 Method

While methods of handling routine may seem of slight importance, they are really the first steps toward efficiency in

management. Method aims to prevent leakage and waste by doing things in an orderly and systematic way, and by bringing to executive attention the sources of waste by means of timely and regular statistical reports.

It must be flexible to allow for further growth and to avoid stifling of initiative, but most of all it must be fitted to the factory. Long and varied experience has shown us that, while the principles are the same, no one fixed form of system is applicable to any two factories, although they may be manufacturing an identical product.

In listing a few essential points of our methods we do not pretend to outline all; nor do we claim that every factory requires a system embracing them all. We simply present several factors that deserve consideration and attention because they are representative of the needs of different concerns in various industries.

Purchasing department routine is essential to maximum output, for an entire order may readily be held up for lack of a very minor part. Some concerns still consider the purchasing department's chief duty to be to get the lowest possible price. As a matter of fact, this must not be overlooked, but the department must be so organized that deliveries will assuredly be on time.

The routine best adapted to most plants, experience has shown, comprises some form of requisition on the purchasing department; a purchase order with follow-up to prevent holding up production for lack of material; a price record which lessens dependence upon

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WHAT OUR CLIENTS SAY

Military goods:

"Answering your inquiry of June 1st, Miller, Franklin, Basset & Company, of New York, were employed by this company during the year 1909, to suggest improved methods in our cost accounting, expense analysis, etc., especially with reference to our manufacturing departments.

"The new system was put into operation practically as advised by them, and is still in use.

"The principal benefit we have derived from it has been that we now have more convenient detailed and accurate analysis of overhead charges in manufacturing and general expenses in sales departments.

"In our judgment, this is valuable information and worth what it costs, providing it is followed up and made use of.

"Their representative, who was with us off and on during the whole year, was efficient and most conscientious in his work."

Boxes:

"We are pleased to advise you that the cost system installed in our plant some few years ago by Miller, Franklin, Basset & Co. has proved quite successful and their work was satisfactory and in our opinion it has well paid us for the expense of installing the system."

A switch and signal company said:

"Miller, Franklin, Basset & Company rendered our Company services of great value. We consider them second to none in their line of business in this country."

Lathes and other wood-working machinery:

"Acknowledging your letter of the 1st inst. Miller, Franklin, Basset & Co. have done considerable work for us during the past four or five years, always with satisfactory results. In fact we have been working to greatly enhanced advantage since putting in their cost system which was installed in 1909.

"We feel entirely safe in recommending them to your favorable consideration."

Injectors, steam specialties and lubricating devices:

"We consider the money that we spent with Miller, Franklin, Basset & Company in installing our cost and profit and loss systems well spent and can recommend them very highly to anyone needing such services."

A manufacturer of electrical machinery:

"They have greatly improved our methods in handling production and the financial part of the system which they installed we do not think can be beaten.

"We are very much satisfied with their services and think you will make no mistake in employing them in any work requiring the establishment of an up-to-date manufacturing system."

Knit underwear:

"Relying to your favor of the 9th, beg to advise we have had Miller, Franklin, Basset & Company go over our mill records and establish a cost system. So far it seems to have worked out very satisfactorily and we are well pleased with their work."

REPORTS AND RECORDS FOR EXECUTIVES

the individual seller and which reduces the time needed to take inventory; an immediate notification to the departments concerned when material is received; securing correct weights and counts of purchased material; a check on quality; and a means for promptly checking and paying invoices.

Perpetual inventories may be kept in practically any business with slight expense and astonishing accuracy, provided the proper method is chosen. On the other hand, many situations do not warrant the expense of maintaining inventories. Our experience in more than fifteen hundred factories has enabled us to solve many difficult inventory problems; we believe we can work out a satisfactory plan for any concern, no matter what its nature.

Location records of patterns, tools and materials expedite production by obviating waiting for needed equipment or materials. The memory of individuals does not have to be depended upon.

Responsibility for errors and theft can be determined through proper records. This covers responsibility for loss of tools, waste and spoilage, and theft of tools and valuable materials.

Production reports really come as part of the planning system as do also reports of piece work earnings. They give the executive a valuable cross-sectional view of the operation of the plant at a glance.

Performance records of materials, supplies and tools give a line on the most economical grades and makes regardless of first cost. These records on

leather belting alone, in one plant where we installed them, saved over \$5,000 a year on purchases which had amounted to \$17,000 a year: this in the face of a 51% increase in belting prices and 32% increase in plant production.

Perpetual appraisals and registers of property and equipment are of value for insurance purposes and deter over-loading of the assets by a management which is pecuniarily interested in profits. They are also of inestimable value in preparing depreciation figures for tax report purposes and later in substantiating the figures taken.

Reports for executives, if chosen to give only the significant facts of the business, and sufficiently condensed to give the information quickly, are great aids in making decisions bearing on the success of the business. Too many reports which executives get contain useless information and necessitate wading through a host of useless figures to get at those that are vital. Sometimes graphic methods of presentation are desirable: this depends upon the man who gets the reports. We believe strongly in condensing reports and giving only essential figures.

Modern accounting methods, designed to give pertinent facts about the business, rather than to be solely a handsome set of books, are needed in many otherwise well-balanced concerns. The general books should be tied into the cost system as we have already seen. Then, too, there are many short cuts such as voucher checks, charge registers and so on, which cut down the clerical labor required and give even more accurate

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WHAT OUR CLIENTS SAY

Vitreous sanitary ware, two letters. We installed cost accounting systems for many concerns in this industry:

"As to the cost system installed for us by Miller, Franklin, Basset and Co., would say that their system and service have been extremely satisfactory, and we would say further that this company has installed the same system in a number of the potteries engaged in our branch of the trade. We believe that all of the sanitary pottery concerns in which their system has been introduced have found it entirely satisfactory and in our own particular case it has filled a long felt want. We have no hesitancy in recommending this concern very heartily should you desire to have work of this character done for you."

"With regard to Miller, Franklin, Basset & Co., about whom you inquire in your letter of the 8th, we would say that we cannot speak too highly of their work.

"This company installed a cost system in our plant as they did for a number of the sanitary potteries and we are more than satisfied with the system and their services. This same opinion is shared by all of the potteries who have engaged them for this kind of work and we recommend them most heartily to anyone contemplating the installation of a cost system."

Pottery, earthenware and porcelain:

"We have only the highest recommendation to make of their system, and candidly believe that if you are looking for a cost system and efficiency system, you will find theirs among the best."

From the secretary of a national hardware association:

"By vote of our association the executive committee was directed to secure from our members at large an expression of their experiences with cost accounting methods, with a view to ascertaining what systems had proved most satisfactory.

"Because of the number of replies from our members endorsing systems installed by Miller, Franklin, Basset & Co. it was decided to recommend their services to all of our members, and subsequent developments proved the wisdom of this selection."

A glove manufacturer:

"We engaged them some years ago to overhaul our office and factory system, and found their work all that was claimed for it and have followed their methods ever since. We have never regretted the money paid out—in fact would consider the benefit we have derived worth many times the amount expended."

Paper-making machinery. Our experience with this company goes back 14 years:

"Replying to your inquiry, Miller, Franklin, Basset & Co. installed our cost system in 1906, and the work they did for us at that time proved very satisfactory indeed. Their system we have been using ever since and from our experience we can recommend them to you as efficient and satisfactory people to do business with. Our judgment is that unless you already have a modern cost system in your plant, they can help you."

HOW TIME STUDIES REDUCE COSTS

results than the old methods. We give this factor the most careful attention.

4 Time study

The successful manufacturing organization is constantly trying to make the work of the producing laborer easy and quick, in order to reduce costs, increase production and make the worker better satisfied with his job.

The workman usually has neither the desire, technical training, nor breadth of vision to increase his producing capacity. Even if he has these qualities he is practically powerless to put improvements into effect, either from force of discipline or because of his own code. Yet he is the only one with a complete and highly specialized knowledge of the details of the operations he performs.

Time studies give the details of this specialized knowledge to an engineer, who has the advantage of incentive, technical training and breadth of vision and the further advantage of being unhampered by restraints of shop discipline. His sole duty is to make improvements.

Furthermore, the record of his stopwatch gives him an accurate measure of what may be justly expected in quantity of output.

We apply time study to individual operations for the following purposes: *Standards of production* which are just, both to the employer and to the workman, cannot be set by rule of thumb or by a foreman's guess. If set in this way, as so many are, they are almost certain to be either too low, in which event the company suffers, or too high, resulting in tasks being set which the

workman knows he cannot achieve. This tempts him to "lie down" on the job and causes both him and the company to lose. Standards which are set from accurate time and motion study are fair to both and result in higher production without increased fatigue.

The proper size of gangs can easily be determined by means of time studies. We found in one instance that adding a man to a gang of four increased production 47%. More often, because gangs are usually organized to take care of peak production, we find that decreasing a gang, say from four men to three, will reduce production only very slightly, perhaps only about 10% or so. Either way a saving is effected.

Inefficient use of machines will very often escape observation unless the stopwatch aids the observer. Time studies assure that this inefficiency will be picked up. Correcting it is then usually easy. *Subdivision of operations*, or specialization, may be carried too far sometimes. The time study shows just how far it pays to subdivide the operations and whether, as frequently is true, it is more economical to allow one man to perform a combination of operations.

Efficiency of tools and supplies may best be studied with the stop watch. Otherwise the foreman's often unreliable opinion that one or another is best is the sole guide. For instance, in metal-cutting this includes investigation into small tools as to clearances and angles, kind of steel, types and number to have on hand, forging, heat-treating and so on. In other industries, such as garment making, it is applied to such

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WHAT OUR CLIENTS SAY

A manufacturer of gears, clutches and other automobile parts says:

"It gives us great pleasure to say that the system which you installed in our factory the first part of 1909 has proved to be satisfactory, and has given the desired results.

"We consider we have saved considerable money by using your methods, and cheerfully recommend them to anyone who desires up-to-date ways of determining the proper amount of overhead to add to the cost of their production."

Salt:

"Our experience with Miller, Franklin, Basset & Company was very satisfactory. They made an examination of our plant and in our opinion used a good deal of common sense. They were represented here by some very high grade men."

Springs and tubing:

"We recommended them to several concerns, and have heard very good reports of their work. We can most heartily recommend their services for anything in the line of cost and system work."

From an underwear manufacturer for whom we did both cost and production work.

"They employ, in our opinion, experts in this line of work, and as their experience has undoubtedly been broad, the manufacturer in employing these engineers obtains many advantages. We look upon the work they did for us as a success."

Paint and varnish makers:

"Miller, Franklin, Basset & Company representatives were in our plant for about six months starting in the fall of 1915. We liked these men very much, were pleased with their way of doing business, and it is our belief they helped us as much as any organization of that kind could have helped us under the circumstances."

Success in an enameled-ware plant:

"In reply to your inquiry, we wish to say that Miller, Franklin, Basset & Co. have installed cost system in our plant which is proving very satisfactory. The improvements which they recommended have effected quite a saving."

These linoleum people have used our services for a number of years:

"When we have anything in the way of special accounting or factory efficiency we would not consider going to any other company. We have one of their engineers at work in our factory now."

New England quarriers:

"From what we saw of their work for us we do not hesitate to recommend them as being capable and fully able to give expert advice on efficiency methods looking toward reduction of cost of overhead expenses."

Hollow-ware and gas stoves:

"Answering your favor of July 30th, we are pleased to state that your firm four or five years ago put in a cost system for us, which has been very satisfactory."

HOW TIME STUDIES REDUCE COSTS

problems as the determination of the grade of sewing-thread that is most economical by ascertaining the time consumed in repairing breaks and so on, as against the higher purchase price of better grades.

The advisability of new machines is frequently shown by time studies. Where hand-feeding a machine takes up a large percentage of the time in operating, it is often poor economy not to spend the money necessary to get high speed machines. On the other hand, it may happen that the wasted time of a machine attendant used in feeding is much cheaper than the purchase of attachments. Scientific knowledge of the time taken obviously is the best guide here.

The best practise in any operation may be determined by analyzing time studies. This results in large savings especially in hand operations.

Location of work and tools. A time study which showed us that a trifle more than 20% of one man's time was spent getting tools and work, resulted in a re-arrangement which cut this wasted time to 2.36%.

Unnecessary fatigue may be prevented by eliminating needless lifting and walking or by changing awkward operations. Usually these faults are not apparent until a time study shows definitely the time lost in doing them.

Designing proper accessories such as jigs, tools, conveyors and so on is often suggested by an analysis of the time study. Work-holders of proper size and height, tool-boxes of correct proportions, safety

devices and automatic control devices for machines are usually effective in boosting production and are often the result of time study.

Improper handling at one stage may result in lost time in succeeding operations. Time study will show this.

The advisability of wage incentives to increase output may be indicated by the time study. This is discussed in detail under the subject of wage incentives.

The arrangement of machines is frequently not the best, and the time study may suggest a re-arrangement which will save time and money. Many times this results in having the man who "receives" from one machine feed to another thus reducing the payroll. In many other ways a re-arrangement of machines saves time, labor and expense.

Unbalanced equipment results in congestion of materials or in idle machine hours: both are costly. Time studies which show the capacity of every machine in the plant disclose unbalanced conditions. Often a single machine added to the "neck of the bottle" in a fairly large shop will increase the plant's production 50% or more.

Physically unfit workmen are often spotted by time study. Sometimes they can well be used on other operations and a fit man put on the other's job.

Piece rates should always be based on time studies; never on guesses. This is discussed in detail on page 27.

Mismanagement by executives is often-times evident only through time study of workmen. The time lost through lack of discipline, lack of instruments,

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WHAT OUR CLIENTS SAY

Clothiers, hatters and furnishers:

"We are very pleased to say, as we have on several other occasions, that the work you did for us a number of years ago was very satisfactory indeed.

"Prior to your installing your system, we had had a great deal of trouble with leakages, which we were unable to locate, but since that time we have had no difficulty whatever in that way.

"We really feel that your system has saved us thousands of dollars."

A well known match manufacturer in whose boxboard plant we worked, says:

"The work done by Miller, Franklin, Basset & Company at our boxboard mill was entirely satisfactory. Our experience has been that they are a thoroughly capable and reliable concern to have do work."

A lumber company:

"They furnished the rim manufacturers with an accurate report of the actual cost of production of a standardized product in the various plants throughout both the United States and Canada."

From a Pennsylvania coal mining company which employed us:

"All the work Miller, Franklin, Basset and Company have done for us has been very satisfactory."

From one of the many paper mills which we have served:

"I beg to say that Miller, Franklin, Basset & Company, engineers and accountants, did some work for us which was entirely satisfactory."

A manufacturer of knives said:

"We had them make a survey of our plant and their work was very satisfactory to us.

"I consider them competent and able to tackle a proposition such as you have put up to them in a manner which, I am quite sure, would be satisfactory to you."

Clay and porcelain products:

"There is no doubt about their being quite proficient in their business, and we now take a great deal of pleasure in the feeling that our cost department and our accounting system are second to none."

A big machine-tool plant:

"In our opinion the system is very efficient, and one that obtains results without a lot of unnecessary work being involved."

Bed springs, steel couches, etc.:

"We have to advise that Miller, Franklin, Basset & Company installed our cost system about six years ago and same has proved very satisfactory"

An Ohio tile company:

"Miller, Franklin, Basset & Company did some work for us which was entirely satisfactory and we are pleased to recommend them for your consideration."

Woolens and worsteds:

"Miller, Franklin, Basset & Company installed a cost system for us during the year 1915, which proved very satisfactory."

WAGE INCENTIVES THAT INSPIRE THE WORKER

delay in delivering tools or materials to the workman, poor condition of tools and a hundred similar faults become apparent when the lost time is recorded. The surest way to get the workman to do rapid, careful work is to appeal to him through his pocket by giving him a wage incentive. This may be either a piece work rate or some adaptation of a premium or bonus system. Even those workmen who must by the nature of their work remain on day rates—the so-called nonproducers like clerks, janitors and so forth—can be stimulated by financial incentives. This point will be brought up again under the heading "collective bonuses."

5 *Wage Incentives*

To get the greatest success from a wage incentive, there must be willing co-operation of the workman with the management and in no less degree of the management with the workman. Absolute fairness and justice, therefore, must govern in setting rates, and good judgment must be used in choosing the kind of wage incentive.

If the condition of the material, tools or machines necessarily varies to such a degree as to interfere seriously with the workman's earning capacity, it is obviously unfair to pay him on a piece work schedule. It may be argued that conditions will average up in the long run, but it must be remembered that the workman is not a capitalist and that the one lean week when his pay falls off through no fault of his own, will be remembered long after the fifty-one fat weeks which may follow.

The kind of incentive to be used is influenced by consideration of the clerical and operating simplicity, justice to both employer and worker, nature of the work, probability of uniform production being possible and so on.

Setting fair rates. When intelligently used, time study eliminates all guess-work and unfairness. The engineer who makes the study needs to have a sympathetic understanding of the workman's viewpoint and know how to make a tactful approach, else he is sure to meet with great opposition from the workmen. About as dangerous an experiment as can be made is to turn over the setting of rates to inexperienced men. Here, above all, is the experience and judgment of the expert needed. Then too, since he is an outsider, he is free from internal influences that might warp his judgment.

Proper allowances for the personal needs and rest of the operators must be considered in setting rates: lessening fatigue often leads to increased production. The amount of rest needed depends upon such factors as weight and handiness of the article and degree of concentration and activity required by the work. Excellent results have been achieved by rotating a gang on work where one man's task was disproportionately tiring.

The workman must understand the method of payment if it is to be of the greatest value. If he does not understand how his pay is figured he will be suspicious of the method and will fear he is being "done." It is always essential to have a simple plan and to make

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WHAT OUR CLIENTS SAY

A small foundry:

"Miller, Franklin, Basset & Co. installed a cost system for us, and it has been extremely satisfactory. They are careful, intelligent people, and we are glad to recommend them, and a fair statement of our appreciation of their value would be expressed about as follows: *we would not go back to the old system for ten times what we paid these people for our installation.*"

A brass goods manufacturer; two letters:

"Relying to your letter of the 7th inst., the firm of Miller, Franklin, Basset and Co., did some work for us a few years ago with entire satisfaction to ourselves. We found them reliable and careful and we have reason to believe them to be entirely responsible."

The second letter:

"In reply to yours of June 1st, Miller, Franklin, Basset & Co. did some work for us some two years ago, and we were entirely satisfied with the character of the service performed. The job was not a large one, but we have reason to believe them to be among the best of the firms in that line of business."

Water-wheels and power-transmitting machinery:

"Miller, Franklin, Basset & Company installed a cost system for us some years ago, and we are pleased to say it has turned out most satisfactorily. All their dealings with us have been businesslike and satisfactory. We think they are abundantly competent to work out intricate problems in manufacturing establishments."

Underwear:

"They worked out for us a scientific cost system which we believe is accurate and a much better system than we had before. These people have had a great deal of experience in all kinds of factories and go into the details of cost accounting in such a way that we think you will get a lot of additional data that you were unable to get before, in fact we think they will be able to give you some things about your costs that you never thought of before. We certainly feel safe in recommending their work."

This is what a large hosiery manufacturer thinks of our work:

"They installed for us a cost system which is thoroughly up-to-date and complete in every particular, so far as we can see, and the same can be operated at very little extra expense over our old system, which was very incomplete."

Wholesale grocers:

"In regard to Miller, Franklin, Basset and Co., we wish to advise that we had them do some work for us some ten or twelve years ago which proved very satisfactory as to expense and we consider the service rendered us to be good value."

Vehicle wheels:

"We have your favor of recent date and beg to advise that Miller, Franklin, Basset & Co., engineers and accountants, installed our cost system and also did some efficiency work and we are pleased to say that we are perfectly satisfied with their installation."

WAGE INCENTIVES THAT INSPIRE THE WORKER

sure that every workman thoroughly understands it. At the time the men are being educated as to how the plan works they may well be "sold" on the justice of it and shown how, while increasing the company's profits, they are at the same time earning more themselves with less physical effort. In this way their co-operation may be easily obtained, provided of course the incentives have been correctly devised.

Comparative records of employees which show their efficiency as measured either by percentages or by dollars, are effective spurs to the men when used in conjunction with wage incentives. They give the spur of contest to the day's work by pitting man against man or department against department. We have secured almost unbelievable results in this way.

Checking earnings is easier under some forms of wage incentive than under day-work. We always provide an effective check to prevent false reporting or payroll padding, which, unchecked, frequently runs into large money losses.

Incentives to reduce waste. One effect of straight piece work payment is naturally to tempt the operator to scamp his work in an attempt to run up a high piece score. This necessitates unusually close inspection. But the tendency may generally be overcome with a quality bonus. The first step is to determine standards for allowable waste and spoilage. Then a bonus may be given for reduction of the waste below the standard. This is usually effective where the company is dependent on the workman's skill or judgment. Or a

high piece rate for output may be set, based on standard waste with deductions for exceeding the standard.

Quality bonuses have often proved a stumbling-block for the factory executive who has attempted to install them. Often in the effort to increase earnings under a quantity incentive, the operator not only wastes material but does not use due care to turn out a high quality of finished product. This may cause a large loss through goods which fail to pass inspection or which must be sold as seconds. To overcome this, we ordinarily first determine standards for quality and then work out a plan fitted to the peculiar needs of the plant which will reward the worker for excellence of output and for consistent performance.

Equipment which depreciates rapidly may be given longer life by giving the operator a bonus based on his keeping the machine in good condition and not abusing it. This is often effective.

Collective bonuses of many kinds may be offered, not only to the productive but to the nonproductive workers as well. Usually they are based on the co-operative spirit which results in savings effected by increasing output from the plant as a whole. In one plant a collective bonus resulted in a 26% increase in production within three months of the time it was started, without increasing either the equipment or the number of workers on the payroll.

6 *Physical Arrangement of the Plant*

The physical condition of the plant receives our attention when it affects the

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WHAT OUR CLIENTS SAY

Harness, saddles and other leather goods:

"In reply to yours of the 16th, in regard to services rendered by Miller, Franklin, Basset & Co., engineers and accountants, will say that the work which this firm did for us was entirely satisfactory and we are glad to recommend them to you.

"We believe that they will give you excellent service. Both from our experience and from our indirect knowledge of them we believe them to be highly efficient."

Another lithographer:

"Messrs. Miller, Franklin, Basset & Co. installed a cost system in our plant that has given excellent results. The system has been in operation six years and we appreciate its value more each year. Their services here were highly satisfactory and we believe you will find them very helpful to you in your business."

A manufacturer of fine mechanical tools writes:

"In 1908 and 1909 you installed a cost system in our factory. This system with changes and additions as have been necessitated by changed conditions has been in force since it was installed and has been very satisfactory in its operation."

Importers of tea, coffee and spices:

"In reply to your letter of the 15th, would state that Miller, Franklin, Basset & Company installed a system of cost accounting for us a number of years ago, and it is still in operation and quite satisfactory."

Fruit syrups, etc.:

"In reply to your inquiry of the fifteenth, regarding Miller, Franklin, Basset and Co., as you know we are a new concern, but since the inception of this business these people have been of very great service to us. In fact, I consider the services they are capable of rendering, invaluable to any firm."

A prominent Wall Street banking house:

"I am very glad to answer your inquiry in regard to Miller, Franklin Basset & Co. Some years ago, we employed this firm to introduce if possible a cost accounting system for us, such work having never been before attempted in the Wall Street district, so far as we could ascertain. The work they did for us at that time was very satisfactory."

From a steel company in Canada:

"This firm did some work for us a few years ago and we feel that we received a great benefit from their services. We do not think you would make any mistake in having them take up any special work for you."

Bobbins and shuttles:

"They were apparently very skilful in their line, and we know of no other concern that we would be likely to employ should we have any need of such services."

A woolen manufacturer:

"Miller, Franklin, Basset & Company installed a cost system for us and we found their work very satisfactory in every way."

MAKING THE PLANT A GOOD TOOL

operating efficiency. Frequently we are able to recommend re-arrangements, improvements and comparatively slight additions which increase production or decrease costs out of all proportion to the slight outlay required.

The points covered here are only those which are given attention by our production and industrial engineering department. We have also a construction and valuation division which prepares complete plans and specifications for new plants, and for changes to existing plants. It also supervises the work of contractors. The activities of our construction and valuation department are described in another booklet.

Among the physical factors affecting output which we examine are:

Facilities for handling material. This includes locating machines and departments to obtain the shortest possible routing of material through the plant, thus saving time and effort and avoiding congestion of materials due to loops and "blacklashes." We examine into the need for conveyors, and recommend whatever type is best suited to the need, whether mechanical, gravity, or truck. This applies not only to the inside of the plant, but to the facilities for receiving and shipping as well. Often it is advisable to replace or repair floors to facilitate trucking. In one instance, we saved a client more than \$500 a month in trucking expense by recommending that floors better suited to the need be laid in some departments.

Storage facilities often may be increased by bettering the equipment in the storerooms. Whether to use racks, shelves,

bins or other containers is a problem we approach. In one plant, a crowded storeroom was made to hold 13% more material by replacing the bulky wooden shelves and bins with compact steel. Often it is not possible to provide additional storage space and then it is necessary to conserve in some such way whatever is available.

We look into the question of whether a single centrally located storeroom is best or whether time and expense may be saved by splitting the storerooms up and locating them so that they will be more convenient to the various producing departments.

Tool rooms are subject to much the same scrutiny as storerooms; convenience, available space, arrangement and location being considered.

Lighting, ventilation and heating are powerful factors for or against production. Sometimes a coat of white paint, a re-arrangement of lighting-fixtures, or even regular washing of windows will not only boost production but even decrease accidents. Where noxious fumes or dust are present, a ventilating system will build good-will for the company among its workmen. A well-lighted, well-ventilated, properly heated shop is naturally chosen as a place in which to work in preference to another, less pleasant. Sanitary conveniences, too, are not overlooked by the worker when it comes to picking an employer.

Safety devices, aside from their humanitarian aspect, often result in faster work. The man who is afraid of his machine or of the conditions surrounding him is bound to work slowly for safety's sake,

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WHAT OUR CLIENTS SAY

Webbing and cotton belting are the products manufactured by the very large company which wrote the three letters that follow:

"Their work was entirely satisfactory and, as a result, we have an expense analysis which gives us all of the necessary details of our business without going into the minute details which so many systematizers inaugurate, and which are so useless and take so much unnecessary time on the part of an executive to examine."

"It gives us pleasure to say that Miller, Franklin, Basset & Company did for us what we did not believe was possible, i. e., the separating of our plant into various departments and applying the operations and supplies definitely to their proper departments. That was our main object in securing their services.

"In addition to that, they installed for us a cost system, giving us a very comprehensive expense analysis, which, in addition to the information it gives us, effects through its operation economies through our entire plant.

"We have confidence in their ability to get results, and in our judgment they do so at a minimum of expense."

"In 1912 they installed for us a cost system which gives us all the details of our business without burdening us with a mass of unnecessary details, or involving the use of a large clerical force.

"We have absolute confidence in the organization and consider the expense involved has been a profitable investment for us."

The three letters that follow are from a concern which makes carpets and rugs:

"The work was thoroughly and intelligently performed by them, and the service has been valuable to us.

"We later engaged them again in another department, and their report and recommendations in that case have been of material assistance to us."

"We employed Miller, Franklin, Basset & Co. of New York City upon investigation work in connection with efficiency in one of our departments about two years ago.

"The report made to us was thoroughly and intelligently prepared and satisfactory."

"They assisted us quite well in establishing a plan for controlling and following up special orders through the manufacturing processes. They went about the work in a practical way and the results were satisfactory to us."

Clutches and transmissions:

"We feel that this concern is most reliable and that the men they have in their service are very efficient and well posted men in their line.

"We are indeed very glad that we decided on this company to do our work, and feel sure that should they be favored with your proposition you will be very much pleased with the results."

A paper company:

"My impression so far as we worked with them is that they are good people and know their business."

PREVENTING THE WASTE OF MATERIAL

if for no other reason. Sprinkler systems and other fire-prevention methods not only pay for themselves by lowering insurance rates but improve the morale of the workers.

7 *Eliminating Material Waste*

It is seldom possible, of course, to prevent all waste of materials in manufacturing, but we have rarely seen a plant where we were unable to cut the waste considerably. Savings amounting to several thousands of dollars a year may often be effected in these three ways:

- 1 By making less scrap
- 2 By preventing the use of too much material, and
- 3 By salvaging the necessary scrap to best advantage

Incorrect manufacturing methods are a fertile source of waste. For instance, in the heat-treating department of one plant it was customary to break one piece out of each 100 to test the depth of carbonization. For this purpose, we substituted for the good piece, one already spoiled in a preceding operation and thereby saved upwards of \$3,000 a year.

In a knit-goods mill we found that improper marking of the end of cloth rolls was wasting unnecessarily more than \$10,000 a year. We could tell of hundreds of similar cases.

One of the first investigations of material waste that we make is for material spoiled by manufacturing methods, and we usually find that by correcting the wrong methods the waste can be at least partly eliminated.

Improper cutting of raw materials is also worthy of attention as it causes much waste, either because of poor layout of the work or carelessness on the part of the cutter. Where the value of the material is great, even a slightly better layout of patterns on the material will result in astonishing savings. It often pays to give a good deal of attention to juggling the patterns around to get an extra piece or two out of material.

Centralizing the cutting in a department which does nothing else, rather than letting each workman do his own, is often worth while.

Even the cutters are sometimes careless, however, and then it is generally desirable first to standardize the cutting and then to offer an incentive to the cutter to meet the standard.

Poor workmanship spoils a lot of material in most plants. It is due either to pure carelessness or to a piece rate which puts a premium upon speed rather than quality. Sometimes spoilage of this kind can be reduced by mechanical safeguards, but the most effective method usually is to offer a quality bonus.

First we generally study the existing piece rates to make sure that they are fairly set and that they do not, by being too low, put a premium upon spoilage.

Then we devise, where possible, an incentive which will reward the workman for carefulness and high quality of output. We have done this successfully in nearly every industry.

Using too much material is a common source of waste. Generally, by setting a standard amount of material to be

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WHAT OUR CLIENTS SAY

A company, whose product is vulcanized fibre, wrote us these two letters:

The first letter:

"This is one of the oldest companies in their line of business and has always had and still possesses the reputation of being one of the very best. It is owned and managed today by four or five efficient, energetic young men who understand their business thoroughly and it is our belief that their work is of the best. Should you be desirous of installing a cost system and having some work done along the lines of factory efficiency, we believe they could give very satisfactory service as they certainly did to us."

The second letter:

"The writer has a considerable knowledge of the abilities of the various concerns doing this class of work and it is his opinion that Miller, Franklin, Basset & Company are in the very foremost rank. They are one of the very oldest concerns doing this class of work and unlike many of the firms that started in the business at the time they did, they have kept abreast of the times and are today doing as good work as they ever did. In fact they have kept abreast of the times and strengthened their organization as the condition of the times demanded.

"Their methods are not spectacular but are common sense in the extreme, and we feel sure that if given good co-operation by your heads of departments they will give entire satisfaction and that you will feel the money you have paid them for their services was a wise investment."

Crucibles and other manufacturing chemists' equipment:

"The writer is taking the liberty of replying to yours in reference to the work performed by Miller, Franklin, Basset & Company. We are pleased to advise that this was highly satisfactory, and take pleasure in recommending them to you."

A knitting company says this:

"Through the system our plant has been divided into departments and it is very easy from the monthly reports to check up overhead and other expenses as they occur in the different departments.

"These people do not seem disposed to enter the plant and turn it upside down in order to install their system, but rather they make their system fit the business with as few changes as possible."

Pottery:

"We endorse most highly the services of Miller, Franklin, Basset & Co., of New York City. The system is not in full working order yet, but every indication confirms us in the opinion that our money will have been more than well spent and we have nothing but praise for the results so far obtained."

Motor parts:

"This company has done considerable work through all our plants and we feel that investments in their services have been profitable ones. They have done some good work for us and we know that they have done some good work for other concerns."

IMPROVING THE HUMAN ELEMENT

used and offering a bonus for meeting this standard we are able to reduce it materially. Supplies such as sandpaper, thread, oil and so on should as a rule be issued only on requisition. It sometimes pays even to put a wage incentive into effect here.

Salvaging the scrap-heap offers a way to realize on waste which cannot possibly be avoided. Sometimes a way to profitably utilize the waste material in the product may be found.

Often where the scrap cannot be used in the product, a new line may be added to utilize the waste. A case in point was that of a manufacturer of gloves who made penknife cases and watch-covers from the cuttings of his glove-skins.

Often the material which is scrap for one business is the valued raw material of another. If that is so, a much higher price can often be obtained from another manufacturer than can be had from the junk-man.

It usually pays to sort scrap into grades rather than to lump it and sell it as a whole. Our knowledge of markets is a valuable guide in getting the greatest return from materials that must go to the scrap-heap.

8 Organization

Frequently by slight changes in duties, considering the peculiar aptitudes of the men in a concern, much more effective management results. When requested, we make suggestions along these lines. Organization is needed to give force and action to the methods we install. Therefore we find it well sometimes to give thought to the following:

Lines of authority, together with limits of authority, should be definitely understood. Often the clearest way to show these lines and limits is by an organization chart. The existing conditions should not be violently upset but it is usually possible to adapt the existing organization to new requirements.

The new duties of individuals brought to them by the work we install are always carefully taught them by us. We oversee their activities until we are sure they are able to go it alone.

Workmen's representation. If it seems desirable to stimulate the interest of the workmen by giving them representation in the management of the plant, we will guide the work in the light of our wide experience in work of this sort. As we have already said, while undoubtedly effective, it must be approached carefully and the installation made step by step. Let us see what workers' representation should accomplish:

First, it should provide the men with an unobstructed channel through which they can get their ideas and suggestions across to the management.

Second, it should throw upon the workers a fair measure of responsibility in settling such points of policy and management as directly affect them.

Third, it should supply them with a knowledge of and interest in the company as a whole, to take the place of the narrow interest—or none at all—which they have in the necessarily restricted job at which they earn their wages.

Now, if we are to get the real interest of the men, we must give them real responsibility. Above all things, they must

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WHAT OUR CLIENTS SAY

A manufacturer of differentials, transmissions and clutches.

"Answering your letter of November 9, concerning Miller, Franklin, Basset and Company, beg to advise that they have been with us now for about one year, and while they have been able to work out a great many of our problems to our benefit, they have not as yet finished their work; and inasmuch as we are at the present time erecting new buildings in connection with our present plant, and in which when completed their recommendations as to absolutely new arrangement of machinery will be effective, we are hardly in a position at this time to advise you as to the greatest benefits that we expect to derive from their work.

"We have had other recommendations, however, from manufacturers who have had their service and the results reported by them have been amazing and inasmuch as their line of work was very similar to ours, we shall expect in the new arrangement to manufacture our product at a very much lower cost than under our present system."

On another occasion they said:

"The value of any efficiency installation system, we believe, rests largely with the quality and calibre of the individuals directly on the premises doing the detailed work. The calibre of the people which they furnished was of the very highest."

Screws and bolts:

"Their work was done in a very thorough manner and the cost to us seems to have been a paying investment."

From a builder of planers and boring mills:

"Miller, Franklin, Basset & Co. installed a complete cost system in our plant a few years ago, covering every detail of our manufacture. We now have a system that gives us accurate costs, and gives them to us promptly and we are able to tell at the end of each month just how we stand. We are well satisfied with the system in every respect.

"In our opinion this company should be able to install any kind of a premium system or cost record that may be required for your work."

Porcelain, pottery and earthenware:

"All we need say for Miller, Franklin, Basset & Company, is that they are strictly first class experts in their line and their system is the best one offered, as we searched over the whole field, and it was not a case of expense entirely, but of a system that would give practical results."

Another big paper company:

"Replying to your letter of the 9th in regard to the services of Miller, Franklin, Basset & Co. would say that I consider these people a high grade and well informed firm. They are careful in securing data so that you can rely upon it. In their time studies their representatives are careful and accurate."

Marine hardware:

"The service rendered by Miller, Franklin, Basset & Co. was quite a comprehensive one and very satisfactory and we are using their system, as installed a number of years ago, with a few minor changes."

GIVING MEN A PRIDE IN THEIR WORK

choose their own representatives. One experiment of this sort failed flat because, while it was called "workmen's representation," the "representatives" were really appointed by the management. The whole scheme was patently a fake.

The second class of representation, which is also more likely to fail than not, is the shop committee plan in which elected delegates of the men sit in conference with the management. Either they will be so awed that they will have little to say and so lose the confidence of their constituents; or, being fearful of their constituents, will do little but object and register complaints.

When, however, we examine those forms of representation which have succeeded it is easy to see why they have. They are the ones where the powers of the workers' representatives are not patently abridged; where the responsibility is put upon the workers and they are asked to bring in not complaints, but decisions.

Usually it is not best to dump, unexpectedly, full power upon the workers, nor to start with a full-fledged, elaborate plan.

Our own experience in making installations of workers' representation and our observation of similar plans put into effect by employers, satisfies us that the plan is sound and exceedingly effective. But we believe the enfranchisement of the shop should be gradual and no more elaborate than the specific conditions require.

As a first step we frequently ask the men to elect inspection committees. Inspection is always a cause of dispute

where workers are on piece rates; but if the decisions are put up to an elected committee the inspection is better cared for than ever and decisions which you as a manager could not enforce, will be easily enforced by the committee. From this committee, and from the training and responsibility which it gives, other elected committees spring.

For instance, wage committees can take up wages and rates; efficiency committees will investigate and report upon better methods; and so on until sometimes the committees become so numerous that co-ordination is necessary. Then a representative body of the workers as a whole can be elected with the subcommittees subordinate to it.

The ultimate result may be a representative body or group of bodies, like the House of Representatives, comprising workmen; a Senate made up of foremen and sub-executives, and a Cabinet consisting of the chief executives. It is immaterial what form it takes: the big thing from start to finish is that the workers' representatives should have constructive duties and should be given responsibilities. The whole plan must be the honest and whole-hearted effort of the management.

In installing such a plan two points must be remembered; first, that the powers must be given the men gradually, and second, that the plan cannot be slapped in fully developed.

The best way, according to our experience, is to develop it gradually and where possible as a part of other betterment work in the plant. The installation can often be made coincidentally with the installation of a planning sys-

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WHAT OUR CLIENTS SAY

This client makes both underwear and paper boxes:

"Answering yours of the 4th, Miller, Franklin, Basset & Company, have done work for us for several years and their services have been highly satisfactory in all respects.

"We are using their cost system, production methods and tax service and we believe you will be pleased with them and find the result well worth the expenditure."

Motors, carburetors and launches:

"Miller, Franklin, Basset & Company did some work for us several years ago; in fact, they installed a new system in our plant, which has worked out very satisfactorily, and we consider it a very good investment."

Screw-cutting tools and machinery:

"Miller, Franklin, Basset & Co. did considerable work for our company about five years ago which proved very satisfactory. They started many things for us at that time which we have developed and we consider have worked out profitably, both to the workmen and ourselves."

Loom pickers and loom harnesses:

"Perhaps the best comment we can make is that we thought well enough of their work to have them come again after having thoroughly tried it out for a number of years. We certainly have derived very great benefits in reducing costs, as well as knowing more about the details of the work, as it comes through the various manufacturing processes."

Earthenware, sanitary and chemical specialties:

"If you are considering installing a real up-to-date cost system don't hesitate about employing Miller, Franklin, Basset & Co. We could write you a lengthy letter telling you a lot of nice things, but what's the use of taking your time, so we again repeat 'don't hesitate'."

Textile machinery:

"We are certainly very glad that we employed the services of Miller, Franklin, Basset & Company in installing a cost system in our factory.

"What we wanted them to do especially was to establish for us departmental overhead percentages so that we might better distribute these overhead or burden charges in our costs.

"They did this very well and at the same time made some suggestions to us for the handling of our orders through the factory as well as regarding the ordering of material which we believe were of great assistance."

A manufacturing chemist:

"Replying to yours of June 28th in reference to Miller, Franklin, Basset & Co. beg to advise that I have made use of their services on one or two instances and have found them to be very satisfactory."

A manufacturer of steel dies:

"The work which the old company did for us was very satisfactory and we consider them to be thoroughly efficient and reliable in their line."

WHY OUTSIDE ENGINEERS CAN HELP YOU

tem or with the setting of standard times and piece rates. It can even go along concurrently with the installation of a cost system.

So much for what work our industrial engineering staff can and will undertake to do for a client.

SOME manufacturers are frankly doubtful of the value of the services rendered by industrial engineers. They do not see how an "outsider" can tell them anything about how to run their business; and undoubtedly a manufacturer does know more about the details peculiar to his business than an outsider can know.

Here are three principal reasons why it pays to employ industrial engineers of wide experience:

When a works executive attempts to solve wage and production problems himself, he must do so with a necessarily limited experience. At most, he usually has had experience in only a few concerns and as a rule in only one or two industries.

If he attempts to put in, say, a new plan of wage payment, he usually tries to install a method which he knows to have been successful in another concern, failing to see how the conditions differ from those in his own plant.

Industrial engineers like ourselves are studying not only one plant, but probably from 25 to 50 simultaneously. All told, we have studied and solved problems in many more than fifteen hundred factories. This gives us a range of information covering just about every possible condition in every industry. We know that conditions in one plant which

on the surface appear to be identical with those in another are oftentimes fundamentally different and therefore require different treatment.

You hire us to do industrial and production engineering work in your plant, much as you would an architect, for our specialized knowledge and wide experience in a certain function of business. Any manufacturer knows better than any architect what he requires in a factory building, but few manufacturers attempt to design and build their own factories. To do so would be to save a small fee, and, in almost every case, to waste several times the fee in uneconomical design, specification of material and so on.

So when it comes to permanent methods and problems of management, it is wise to go to a group of specialists—industrial engineers—whose knowledge is based on actual contact with, and study of thousands of management problems.

The managing executives of a business have scant time to withdraw from the current exactions of the business in order to study methods. They are concerned—and properly so—with the day to day problems of buying, selling the factory's output, getting the goods made and shipped, collecting the money, paying the bills and meeting the payrolls.

The factory executive's job is to know all about the manufacturing processes of his business and to get the maximum amount of finished goods completed and shipped. This alone is a man's size job and leaves mighty little time for investigations, study and installation of management methods.

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WHAT OUR CLIENTS SAY

A client who makes woven hose and rubber:

"Replying to yours of the 28th, we take pleasure in advising you that Miller, Franklin, Basset & Co. revised our cost system and systematized our work, both in connection with office and factory, and the results which we obtained have proved most satisfactory."

Yeast and baking powder:

"In reply to your letter of the 12th inst., may say the system installed, and the services rendered by Miller, Franklin, Basset & Co. were satisfactory to us, and it is our belief that the results justified the expense."

Car builders:

They really installed a complete system for handling the works end of the business.

"Their work was very satisfactory and the men who did the work compared very favorably indeed with others in the same line of work I have had experience with."

Paper:

"Relying to your letter of September 4th, would state that Miller, Franklin, Basset & Company were employed by us in the latter part of 1917 and in the spring of this year, on both occasions for cost and efficiency work, all of which was entirely satisfactory."

A mail-order house:

"They are very thorough in their work, and without question, if a concern is large enough to stand the introduction of efficient methods, they will save it a lot of money."

This letter is from a nationally-known shaving soap manufacturer:

"In reply to yours of the 30th ult. we beg to say that the work that was done for us was very satisfactory. We felt that considerable cleverness was shown in adapting things to our particular needs."

Builders of commercial automobile bodies:

"This concern has been doing some work for us for the last four or five months, and we think that they are as competent in organizing factory systems as any concern of the kind in the country. All the men that I have met in this organization impressed me as being capable and honest."

Military and all-metal buttons; two letters:

"They are particularly nice people to deal with. Their method of installing the system did not upset the works but went along with our present system all right and was changed gradually, into their methods. We do not believe you can do better than employ this firm."

The second letter:

"They seem to get at the conditions without upsetting our old system and gradually work in their new schemes so that we do not feel that we are being torn to pieces."

A big printing and engraving house:

"It is needless for us to make any statements regarding the value of your cost system, but it certainly produces results and does everything that you claimed it would."

WHAT WE DEMAND OF OUR STAFF-MEMBERS

That is why there is no reason for a manufacturer to feel that we are doing only what his own executives should be able to do. Our activities are fundamentally different. We come into your plant with none of these routine worries and duties to keep us buried in detail. We are there to do one thing—to determine what methods will aid the business, to design these methods—or systems if you will—and to install them.

One client who employed us recently put it this way:

"I believe," he said, "that I could install a planning system myself which might be satisfactory and devise the proper methods of wage payment, but for three years I've been trying to find time to do it. You won't have anything else to do—so go ahead."

Of lesser value than either of the two preceding reasons is the "fresh viewpoint" which we bring. Some of the old time "efficiency engineers" got along for years with little to work with but this—and they made some startling savings, even so. We place little reliance upon the fresh viewpoint except as it is joined to native ability, technical education, far-reaching experience and knowledge of methods of others.

But it is undoubtedly true that to the inquiring mind and eye, wasteful methods are apparent that have been accepted by those accustomed to them by long usage. Just because a thing has "always been done that way," does not argue that it is the right way. Literally hundreds of such instances have come to our attention. In some of them the solution was so apparent that even the client was surprised when he realized

that these very costly and unnecessary wastes had been accepted for years by his organization.

But these are merely by-products of our work. Usually our greatest value to a client is in studying conditions and planning and installing methods of control and management.

AS OUR work consists in installing definite methods and systems and not in making scattered, haphazard betterments, our personnel is a most important factor in our success.

Mere brilliance or a reputation for having made spectacular savings on a job or two does not qualify a man for our work. Intelligent and educated our engineers must be, but to get the best results each man must be able to use all of the experience and knowledge that our organization has acquired in the more than fifteen hundred factories we have served since 1902. This means that each man must go through a long period of training in our methods and must do all of his work under the close supervision of men who are intimately acquainted with every experience we have had in our long years of practise.

To achieve this thorough supervision we have a definite plan of organization consisting of several operating units, the following being typical. These grades are listed below in the order of their rank and importance:

Director of installations
Assistant director of installations
Supervisors
Semi-supervisors
Installers
Junior engineers

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WHAT OUR CLIENTS SAY

Another underwear company:

"Answering your inquiry in regard to our experience with Miller, Franklin, Basset & Company, would say that we feel that this organization is splendidly equipped to handle factory problems, and what we like about their organization is that they have a practical style of doing things which does not involve a tremendous amount of red-tape as is ordinarily insisted upon by most organizations which term themselves 'efficiency engineers'."

From a builder of steering gears:

"We have your letter relative to Miller, Franklin, Basset & Co. and beg to advise that the work they did for us was done in a satisfactory manner, and comprised the departmentalizing of our overhead cost."

From the same people some years later:

"This company did very satisfactory work for us on two occasions. Their work is done without the usual disruptions attendant upon the employment of efficiency managers and they are particularly considerate of the employer's interest before making radical changes or recommendations. Our past experience would lead us to employ them should we again have work in their line."

A lithographer:

"While the new cost accounting has been in operation only a few months, we are well satisfied. Their method is being used in four or five printing and lithographing plants throughout Ontario."

A paper mill:

"Replying to your inquiry regarding work done for us by Miller, Franklin, Basset & Company, would say that this work was of a special character and perfectly satisfactory. We did not go into this from a standpoint of efficiency of operation in our mill, but more from the standpoint of efficiency in cost accounting."

A manufacturer of satin quilts and cotton damask on two different occasions said:

"In reply to your letter of September 4th, would state that Miller, Franklin, Basset & Company installed for us a very complete cost system with which we have been very well satisfied, and we have no doubt that they would be a great benefit to you."

"We consider that they have done a very efficient job here, and we have what we consider a very workable cost system, although necessarily somewhat complicated because of the vast varieties of work which we make. We feel that you will be very well satisfied with their work."

Drygoods, carpets and upholstery:

"We take this occasion to express our commendation on the work done for us some time since, and to state that we appreciate the thoroughness of the work accomplished, and the marked courtesy shown in all their dealings with us."

"Very satisfactory" work in a woolen mill:

"Miller, Franklin Basset & Co. did some work for us about nine years ago that proved very satisfactory."

HOW WE DO OUR WORK FOR A CLIENT

No man, no matter what his experience, can join our industrial engineering staff in a position higher than a junior engineer, the lowest grade.

Our men must have had training and they must be of such bearing and character as to inspire confidence in the men with and for whom they are working.

The cleverest man will fail in his effort to better conditions in the making of which other men have had a part unless he can gain and hold respect. Respect precedes confidence and confidence is essential to the installation of any new methods, whether pertaining to materials, men or machines.

Staff-members are bound to meet men in clients' plants who are opposed to new methods and they must get their way without causing hard feeling. This makes it necessary that every one of our men have unusually pleasing personalities and tactful ways.

We seldom hire a man who has worked with another firm of production engineers, for we do not want him to have pet fads. We prefer, as raw material, mechanical engineers who have had three or four years' experience in factories. This gives us men who know factory conditions at first hand and who have the point of view of the factory man. With open minds, they are ready to receive the education we give.

Promotion comes gradually through each grade, and only when we are satisfied that a man is able to handle our work well. All of our men work under the close supervision of a superior.

Most installations are made by an installer, sometimes assisted by a junior. But semi-monthly or oftener, the super-

visor in charge visits the job, checks up on the progress made and outlines further steps.

The installers do not take the initiative in devising new methods. That is the task of the supervisors. Supervisors visit installers periodically and are with them on the contracts about one-fifth of the time.

All supervisors are profit sharers of our company and they therefore may be termed partners. Backed by our records of performance and accomplishment in over fifteen hundred factories—in many of which they themselves have worked—these partners plan the new methods needed by a client. They confer with the client to secure sanction for the changes after showing the securable benefits. They then instruct the installers as to which methods they are to employ.

Once a month at least the director or the assistant director of installations—both of whom are partners and former supervisors—goes to the client's plant to survey the work of the installers.

Our aim is to give every man the benefit of every other man's experience, and each man's work is planned so that he will not only have a wide experience installing all of our methods but so that he will have experience in every industry.

A principal duty of the director and assistant director of installations is to make the experience of every individual on our staff the common property of all our staff-members.

They go from plant to plant supervising the work and helping, in the light of their long and wide experience, to solve problems. This enables them to

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WHAT OUR CLIENTS SAY

Bleaching and dyeing:

"In reply to your favor of the 28th inst., Miller, Franklin, Basset & Co. installed a cost system in our plant about three years ago. We are very well pleased with the work they did and can highly recommend their services."

A maker of warps, in Maine, wrote:

"Miller, Franklin, Basset & Co. put a cost system into our plant several years ago. It costs us little to run, is free from a lot of red tape, and checks up not only our mill but office accounts, putting the cost where it belongs."

Steel and iron products, hardware and mill supplies:

"We have your letter and beg to say that Miller, Franklin, Basset and Company did do some work for us eight or ten years ago, and we were very much pleased with the services rendered at that time."

Drop forgings:

"About ten years ago, Miller, Franklin, Basset & Co., did some work for us in installing a cost system, and we feel that the service they rendered us was of a very satisfactory character and of much assistance to us."

Ventilating and drying equipment:

"Relying to your letter of September the 4th, concerning Miller, Franklin, Basset & Company, would say that this company recently completed the installation of a production system for us, and, so far as we have been able to judge, the system is a good one, and is entirely satisfactory to us."

Still another knitgoods job:

"Can only say that everything they have done has been extremely satisfactory. They have installed a cost and production system in our plant, which is working in A Number 1 order, giving us a financial statement monthly. We are sure that you will be very well satisfied with any service they may render you."

Cotton warps:

"Relying to your letter of November 8th, we beg to advise you that we employed the services of Miller, Franklin, Basset and Company, and we have a very good opinion of them and are confident that the system they installed is very accurate and serviceable."

Bank and safe-deposit vaults and locks:

"Relying to your favor of the 7th instant, in regard to Miller, Franklin, Basset and Company, we wish to advise that they installed a cost system for us which we are now using and which we find very satisfactory."

A small paper-box maker says:

"Miller, Franklin, Basset & Co. installed a cost system for us. We are well satisfied with it and believe that they fully understand their work."

A brass and iron goods manufacturer says of us:

"It is the writer's opinion that they are a very capable firm of high standing; they understand their work and are very conscientious in what they do. We have no hesitancy in recommending them to you."

HOW WE DO OUR WORK FOR A CLIENT

avoid dangers which might be hidden to another staff-member, and to apply quickly a method which they have seen work out well elsewhere, under similar conditions.

Through the efforts of these partners we bring to bear on the client's problem not merely the experience of the two or three men we put in his plant, but the experience of every one of our twenty-four industrial engineers.

Our continuous success since 1902 is due not only to the high quality of our personnel but in no small degree to our method of work, which gets results without antagonizing the client's employees.

Our profession has at times suffered through engineers who have gone into plants, uprooted time-honored methods right and left, and antagonized both management and men. Often, too, although the methods newly installed may be right, they do not continue to function after the engineer who installed them has left the plant. That is what comes from trying to inject new methods into an organization.

The installations we make remain in successful operation after we have gone, because we do the work through your own organization.

At first, when making an investigation, we are merely observers asking questions here and there, but in no way interfering with the regular routine of your plant.

When the investigational period is over and the recommendations we have made are approved by the chief executive, we take up the first step recommended and work it out by ourselves. This serves as a precedent to be followed.

Then we instruct the man in the client's organization to whom the new work will naturally fall, show him how we carried out the first step, and make this new work a part of his daily duties.

Then in the same way we take up the next step, always continuing to oversee the previous steps until each one in the organization is perfectly familiar with the new duties to be performed.

In fact, much of the work of actual installation is done by those in the organization who will later have to operate the system. This makes them thoroughly acquainted not only with the "how" but with the "why" of the methods before they have to assume the responsibility for operating them.

Where possible, we always make it a point, when new positions have to be created, to take the logical candidate from the client's staff; the attainment of the new position is thus so gradual that jealousy and ill-feeling do not result.

We do not inject our methods—we get the organization to absorb them, and in our installation work there are none of what we have heard referred to as "hell-periods." We are always in the background; we have no authority and give no orders, and when our work is completed, and we leave the plant, we leave no hole in the organization as we never became part of it.

OBVIOUSLY, such an outline of our work as we have attempted to give here can do no more than touch the high spots. Actually, there is no problem or factor in manufacturing, from designing the plant to selling the product, with which we do not deal.

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WHAT OUR CLIENTS SAY

A manufacturer of envelopes:

"Your favor of the 1st received and in reference to Miller, Franklin, Bassett and Company, would say that about ten years ago, they did some work for us and it was entirely satisfactory. We have followed the lines that they laid out at that time ever since, and we find that everything has come out right."

Textile:

"Miller, Franklin, Bassett & Company did work for us about seven years ago and we adopted practically all they advised. We would say that we would not feel able to manufacture in these days without the system that we installed at that time."

Printing and lithographing:

"We have your letter of the 8th. It is certainly a pleasure to us to recommend the service of Miller, Franklin, Bassett & Co. of New York City. The cost system they installed last year has shown our profits quite satisfactorily."

An automobile manufacturer:

"The services rendered by Miller, Franklin, Bassett & Company several years ago were more than satisfactory, and we believe that the money we paid them was one of the best investments we ever made. In other words, they gave us an accurate system of arriving at our costs, although before we employed them, we thought we had a good system at that."

Shaving and toilet soaps:

"We found them at the inception of our work more willing to adjust them-

selves to our conditions than other people in the same line of business had been. They sent two very clever men here to work out the details of our cost system and the system installed has been working satisfactorily, and we are continuing to use it with profit."

A later letter:

"We are very pleased at any time to recommend your cost system to any one who is interested in it. We consider it one of the best cost systems that is in existence today and would say that we consider it the vital point of our business for without it we would not know where we are from month to month or week to week. We cannot see how any growing concern can get along without it."

An entirely voluntary letter written to us by a big manufacturer of asbestos textiles:

"We owe you an apology for not acknowledging receipt of the report, but we take this opportunity of expressing our appreciation of the good work which your engineers did while here."

"We are delighted with this report and consider it the first real work of this description that we have ever had done. We have in the past spent considerable money with the various concerns in our efforts to conduct our business along scientific lines, but have not gotten anything like this."

"We cannot praise your engineers too highly for the manner in which they handled the whole situation, in spite of the many discouragements which they met with in the work."

THE REASONS FOR OUR SUCCESS

Production, as we have said, affects all of the activities of a business, from finance to marketing, and therefore we, as production engineers, must be and are prepared to deal with all of the client's problems.

That is why we insist that our men be more than engineers specializing in methods and systems. Methods and systems are the tools which enable the manufacturer to make profits. It is profits that our clients are interested in and therefore we must help them to make profits. Our staff-members are chosen and trained to apply the test of profits to all of their work. They have been taught engineering methods which make for profits.

They do not go into a plant with the offensive, superior know-it-all air which, too often, is the pose of engineers. Our engineers do not assume that

the owner knows nothing about his business and that it is their job to show him how to run it.

Rather, they are business men—business men who have specialized knowledge of management problems and who look at your problems just as you do.

Whether a client will be able to profit from our work depends as much upon how we do our work as upon what we do. Therefore it is of primary importance that we do not hinder the normal operation of his business while we are in his plant. We endeavor to make changes so gradually that they are almost imperceptible.

That we have been successful in making profits for clients since we started in 1902 is shown by the statements throughout this book, chosen from letters written by more than fifteen hundred manufacturers.



Deacidified using the Bookkeeper process.
Neutralizing agent: Magnesium Oxide
Treatment Date: Aug. 2003

Preservation Technologies
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111 Thomson Park Drive
Cranberry Township, PA 16066
(724) 779-2111



